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A STUDY OF NEBRASKA CRANIA

By C. W. M. POYNTER

THROUGH the activities of Mr R. F. Gilder the Museum of the University of Nebraska has a collection of over one hundred skulls taken from graves on the bluffs overlooking the Missouri river near Omaha. Interest was first awakened in this region when several skulls of a lower order of development were discovered and described under the title of Nebraska Loess Man, being at first thought to represent an ancient type of man. The University, under Mr Gilder's direction, has carried on a more or less active investigation in the region ever since, and during the past three years the Peabody Museum, Cambridge, Massachusetts, has been represented in the field by Mr Fred H. Sterns. While several of the skulls of this collecton, Nebraska Loess Man, have been figured and described, no attempt has so far been made to study the entire group. I was led to undertake the work at this time because of a very recent find of nineteen skeletons in the immediate vicinity where Nebraska Loess Man was discovered.

The conditions under which most of the crania were found have been previously described and need not be repeated here. I will not attempt to discuss the question of the antiquity of these specimens both because they do not furnish sufficient somatological data to warrant more than a speculation and because Hrdlička (14) has exhaustively considered the question. They do, however, represent a number of distinct types which will be studied in the hope that some light may be thrown on the earlier history of man in this region. I have not attempted an exhaustive description of the various skulls but have only selected such features as furnish the most obvious evidence of common relationship in the different groups into which the collection seems to fall. The names employed as designating the various groups are taken arbitrarily simply for convenience of description.

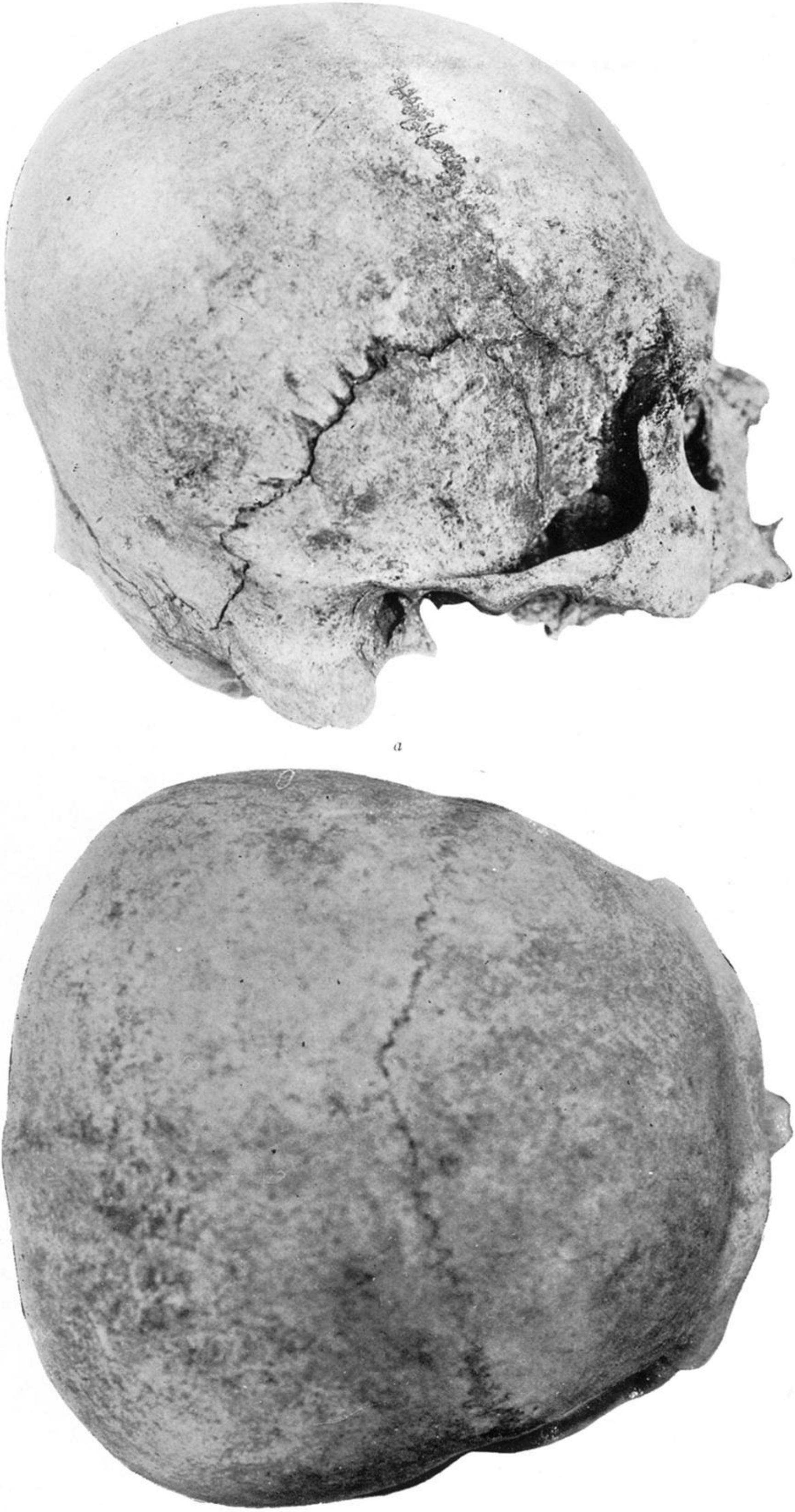
Through the kindness of Doctor E. A. Hooten I have been able to compare these crania with those of the splendid collection in the Peabody Museum, Cambridge, Massachusetts, and some of the comparative tables appearing in the following pages are based on that study. I am also indebted to Professor Barbour, curator of the University Museum, for furnishing me every facility for pursuing this investigation.

WALLACE MOUND GROUP

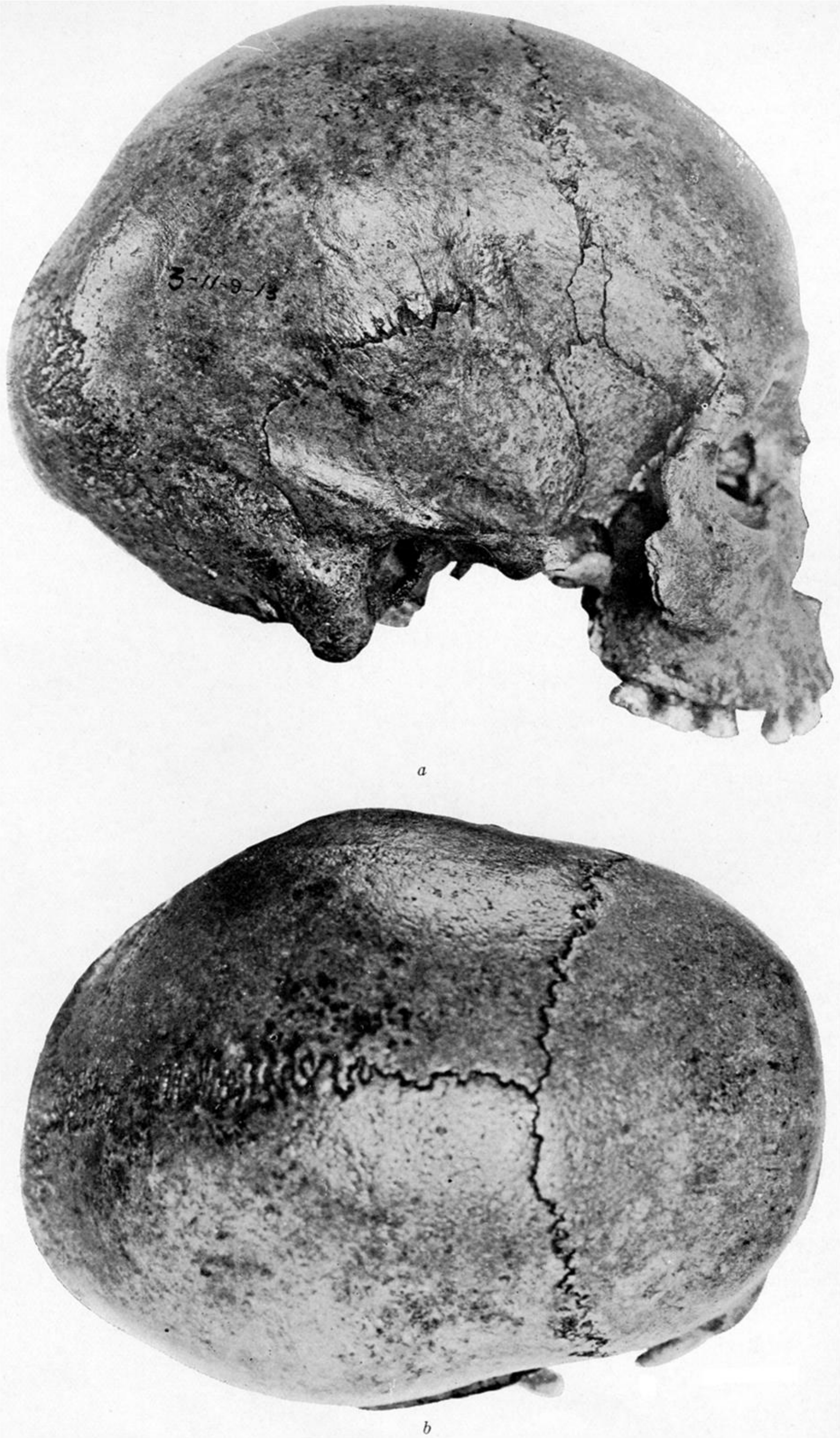
This group consists of twenty-six skulls sufficiently intact for study; they are of a light color, nonfossilized, in a good state of preservation, and many of them are not crushed. They were found in a burial mound in the Childs Point district south of Omaha, on a narrow high bluff immediately overlooking the Missouri river. The narrowness of the bluff insures perfect drainage and in part, no doubt, accounts for the preservation of the bones found there. The skeletons are found buried at a depth of from three to five feet below the surface in a loose clay which abounds on all the ridges in the district. Two or three types of burial seem to have been employed, for some skeletons are found arranged as if they had been thrown full length into the graves; in other cases the bones are grouped in bundles and several so-called scissors burials have been discovered.

The skulls of this group are strikingly similar in their general characters and the majority of them exhibit artificial deformation in the form of occipital flattening; this is not of an exaggerated type, however, and is frequently slightly more pronounced on the right. The deformation, of course, accentuates the brachycephaly which characterizes all of the group.

The general shape and character of the skulls can be seen from the views in plate xxv, which were taken from an average skull with very slight deformation. The supraorbital ridges are not heavy but tend to meet over the nason, giving the latter the appearance of being slightly depressed. The frontal sinuses are roomy, extending well toward the outer part of the orbit. The forehead is quite well developed but narrow as indicated by the



SKULL FROM THE WALLACE MOUND. A. SIDE VIEW: B. TOP VIEW



SKULL FROM THE PLATTSMOUTH GROUP. A, SIDE VIEW; B, TOP VIEW minimum frontal diameter. All sutures are of an extremely simple pattern in both sexes; only three skulls exhibit wormian bones. With the exception of three specimens which show a slight elevation over the sagittal suture all are well rounded over the parietal and occipital regions and none show prominence of the occiput like that characterizing the Plattsmouth group and illustrated in plate XXVI. At the superior occipital ridge in the normal, as well as in the deformed skulls, the occipital bone makes an abrupt angle between the occipital and the nuchal portions, giving to this portion of the skull a peculiar square appearance. The supraoccipital ridge, while distinct, is not heavy except in two crania of old men. Many of the group show a very indistinct temporal ridge and the absence of pronounced ridges for muscle attachments may be said to characterize the group. The external auditory meatus are all more or less compressed and in the majority the vertical diameter is more than twice the transverse diameter.

The face is regular, the teeth and alveoli show very slight prognathism while the gnathic index is 96, which compares favorably with Europeans. The nasal bones are broad and flat, the orbits regular and the palate presents no special features of interest. The teeth are of medium size and ground flat and in many cases show evidence of extensive ulceration at the roots.

The physical characters of these crania suggest a close relationship to the people from the stone graves of Tennessee in the exhibit in the Peabody Museum and no doubt they are closely related. Some of the skulls from the burial mounds of Kentucky seem to be of the same type, while others are dolichocephalic with low foreheads. It is not surprising to find this type so far north when, as it would seem from Hrdlička's (17) report, there is evidence of the same people in Arkansas.

The following table was compiled from measurements of the Wallace Mound Group skulls of the Peabody Museum collection, and data taken from Hrdlička's report just referred to. It is interesting to note that the cranial index for the Tennessee skulls is slightly different from that obtained by Carr (9) from a study of eighty-seven specimens. I selected the group yielding these averages to eliminate artificial deformation and this may explain the difference in results, or since the catalogue numbers of the specimens I employed was above 14,000, possibly they were not included in his study.

TABLE OF MEASUREMENTS TO COMPARE WALLACE MOUND CRANIA WITH THOSE FROM THE TENNESSEE STONE GRAVES, KENTUCKY AND ARKANSAS BURIAL MOUNDS

	Number of Skulls	Length	Breadth	Height	Cranial Index	Height-Length, Index	Height-Breadth, Index
Wallace Mound	26						
Average	......	168.4	143.5	139.6	85.2	81.7	93
Maximum	......	180	154	150	92.7		
Minimum	......	151	136	128	80		
Range	......	29	18	22	12		
Tennessee	25						
Average	......	168.2	141	143	83	85	101.3
Maximum	......	174	148	153	91		
Minimum	......	151	131	137	80		
Range	......	23	17	19	11		
Kentucky	10						
Average	......	164.9	140.7	137.5	85.4	83.5	97.7
Maximum	......	177	148	145	95.3		
Minimum	......	151	136	128	78.5		
Range	......	26	12	17	16.8		
Arkansas	6						
Union Co. Average	......	170.1	133.1	138.3	83.3	84.2	103.7
Maximum	......	176	148	141	88		
Minimum	......	167	138	135	82		
Range	......	9	10	6	6		

PLATTSMOUTH GROUP

This collection consists of parts of fifty-five skulls ranging from adolescence to old age and of both sexes. They were found together in a small area not over four by six feet square and only about three feet below the surface. Parts of three skeletons were found with them but no ornaments or flints were discovered in the neighborhood. The bones are all stained a reddish brown and show a good state of preservation, though badly broken in the majority of cases.

Forty-two of the group are sufficiently intact to study and twenty-five can be measured. As in the group just discussed, one is impressed by the similarity of the general characters which suggest family or tribal relations. Except in possibly one specimen there is no artificial deformation. The supraorbital ridges are not heavy and the frontal sinuses are roomy; in the majority a supraorbital notch takes the place of a foramen and when the latter is present it is in all instances single.

The sutures are complex, possibly not as intricate as in whites, and there is little tendency to elevation over the sagittal suture. A very characteristic feature of the group is the prominent occiput which is frequently accentuated by a depression in the region of the lambdoid suture. This point and other features are well illustrated by the views in plate XXVI, which were taken from one of the more pronounced representatives of the type.

The ridges for muscle attachments are not heavy in any case. The nasal bones are flattened below but pinched together in the form of a "V" at the bridge; the inter-nasal articulation is regular and arched as in the Roman type of nose. The external auditory meatus tend to be round rather than compressed as in the last group. The teeth are large and regular and form a very perfect arch instead of exhibiting an angle at the canines; many specimens show evidence of alveolar abscess. There is slight prognathism; the mandible is heavy but not prominent.

This group of crania is distinctly Indian in character, they, however, suggest a relation to the New England Indians or to some of the Algonkin rather than to any of the Plains Indians with whom I am familiar. The following table of average measurements will present some of the features of the group that the description in the text has neglected.

Table of Averages Compiled from the Dimensions Furnished by Twenty-five Crania from the Plattsmouth Group

	Length	Breadth	Height	Cranial Index	Height-Length, Index	Height-Breadth, Index	Diam. Frontal Minim.	Circumference maxim. (Above ridges)
Average........	179	136	139.9	75.9	77	101	93.6	501.4
Maximum......	190	142	142	80	78	103	101	520
Minimum......	163	126	134	68	72	98	86	474
Range.........	27	16	8	12	6	5	15	46

FORT LISA GROUP

These skulls were found in a burial mound about twenty miles north of Omaha. This mound has been worked but very little and it is probable that the University will carry on further investigations there this year. There are only six crania in the group but they are so different in general shape from any of the others studied, I have thought it would be best to place them in a separate class awaiting future investigations in the region which will, no doubt, determine whether they are individual variations or examples of a class.

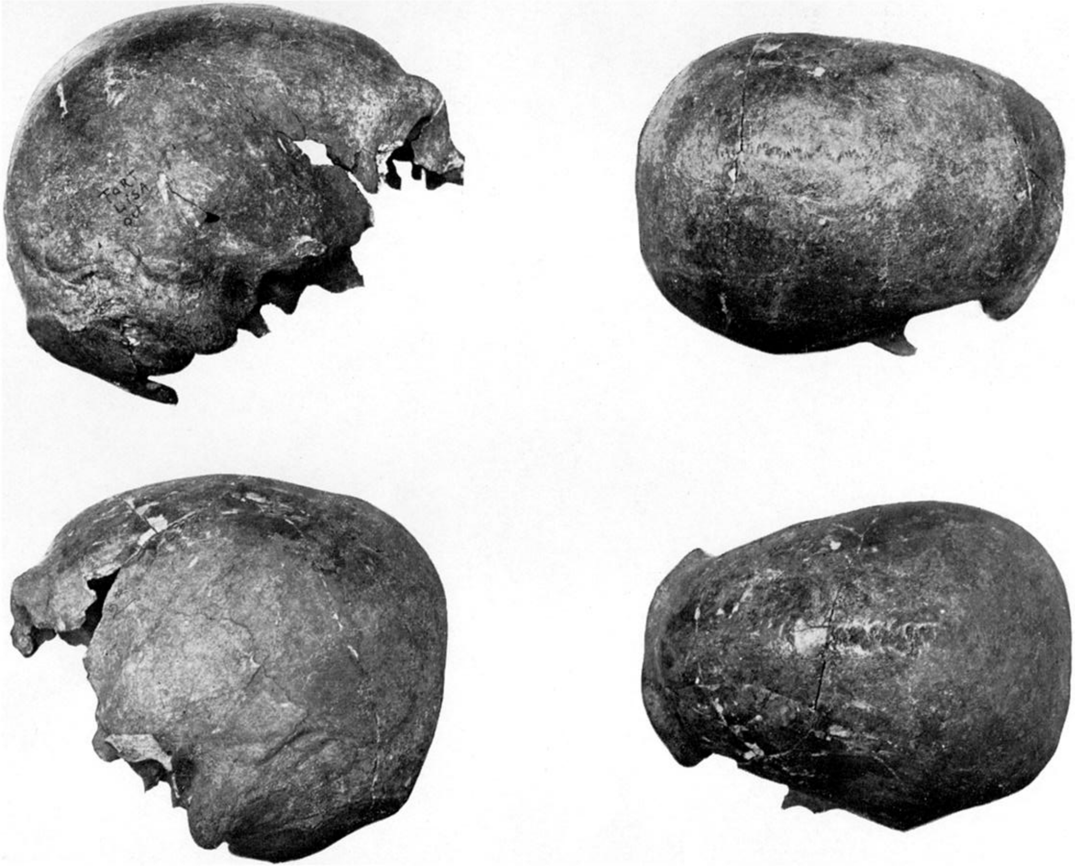
The most characteristic feature of the group is their long narrow shape. The average cranial index is 71.5 while three of the skulls have an index of 69. The minimum frontal diameter average is only 87 mm. The supraorbital ridges are heavy mesial to the supraorbital foramen and the nason is depressed. There are no frontal eminences but moderate frontal vaulting. The suture pattern is very simple and in all skulls there is sagittal elevation; in one case the ridge extends forward almost to the supraorbital ridge but it is evident that the condition is not associated with premature synostosis. The occipital pole is not prominent as in the preceding group and there is no groove in the lambdoid region.

The nasal bones are slender and high and articulate to form a very narrow bridge. Muscle attachments are not heavy and the mastoid processes are underdeveloped. The lack of breadth in the parietal region gives the crania the appearance of slightness and lack of development.

TABLE OF AVERAGE DIMENSIONS OF SIX FORT LISA CRANIA

	Length	Breadth	Height	Cranial Index	Height-Length, Index	Height-Breadth, Index	Diam. frontal minim.
Average........	181.5	129.8	134	71.5	72.8	106.3	87
Maximum......	188	134	136	74.4			95
Minimum.......	175	126	130	68.4			80
Range..........	13	8	6	6			15

The general features of these specimens can be best appreciated from a study of plate XXVII. These very strongly suggest, by



SKULLS FROM THE FORT LISA GROUP, FOUND IN WASHINGTON COUNTY, NEBRASKA their general shape, the Australian aborigines represented by skulls number 47944 and 47495 in the Peabody Museum. An occasional skull is found among the New England Indians with somewhat similar dimensions.

LONG'S HILL GROUP

The groups so far considered have all been found in single localities or burial places and differ in that respect from the skulls which I have considered in this group. These crania were taken from three burial sites, two being situated on the bluffs on the west bank of the Missouri river and the other on the east bank. The first of these skulls were found on Long's Hill and have been described and figured both as to physical characters and location by Barbour (1, 2, 3, 4), Ward (5, 6), Gilder (11, 12, 13), Osborn (19) and Hrdlička (14). The next specimens were found in Fairmont Park, Council Bluffs, when an excavation was being made for a road. No record was made of this find except a note in the local paper and only five skulls were sent to the Museum; these are badly broken and in all the face bones and the base are lacking. The last specimens were discovered by Mr Perry Toney in November, 1914, and are reported here for the first time, Mr Toney has been engaged for some time with Mr Gilder in carrying on excavations in the house sites along the bluffs both above and below Omaha. While working in such a site located on a bluff about two and one half miles north of Florence and nearly a mile south of Long's Hill, he discovered human bones. These are not usually found in the house sites so he called Mr Gilder and myself and we assisted in the excavation.

The surface appearance of the house site is like that of all the others in the region; it is apparently about thirty feet across and about two feet lower in the center than at the edges. The floor line is about three feet below the surface of the ground and the earth covering it is dark and mixed with charcoal. The flints and broken pottery seem to be of the same type as that described by Gilder and Sterns for these houses.

The human bones were found from one to two feet below the floor in a light-colored loose loess which was entirely free from charcoal. The earth about the bones had every appearance of being undisturbed. The excavation of an area about eight feet long and six feet wide revealed parts of seventeen skeletons. Two forms of burial seem to have been employed, for some of the bones were found in bundles placed in an upright position and the skulls piled together. The general character of the excavation is illustrated in figure 90 while figure 91 is an enlarged detail which shows the relation of the burial to the floor line which is indicated by the darker color of the earth.

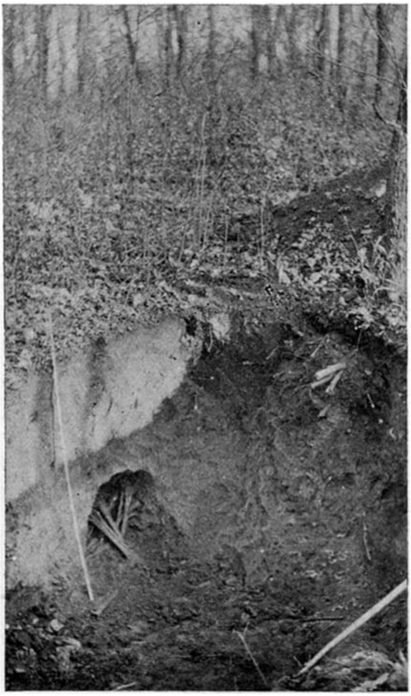


FIG. 90.—A view of a portion of the excavation of the house site where seventeen skeletons were found below the floor level.

Five bodies were found buried entire with the limbs extended and the head toward the northwest. No flints or implements of any kind were found in the earth about or below the bones. About eight feet north of this group of bones, which were near and beyond the south limit of the house, the entire skeleton of a young woman was found on the house floor. Near the northwest limit of the house an entire skeleton was found below the floor line but placed at an inclination of about twenty degrees with the head down.

These bones were all so badly preserved that it was difficult to remove them and the skulls were all crushed. Nineteen skeletons may not represent all to be found in this site for less than half of the house has been examined; it may be that with the exception of the young woman found above the floor none of these skeletons bear any relation to the house and its builders.

The group then which I have designated the Long's Hill group consists of ten skulls taken from Long's Hill, five from Fairmont Park, and three recently discovered by Mr Toney. Since the group contains the specimens so frequently referred to (see literature list) as Nebraska Loess Man number 6 and 8, I will speak of these particularly when they present features differing from the others. All the crania are badly broken and the bone is soft though not chalky or showing any appreciable fossilization. All of the group conform to a type in shape which may be best expressed as ovoid when viewed from the top or side, the greater mass being in the parieto-occipital region. The forehead is extremely low and in the greater number of the skulls there is entire absence of frontal eminences. The minimum frontal diameter is relatively short but this is not as important as the absence of frontal vaulting in giving the specimens the appearance of a low order of development.

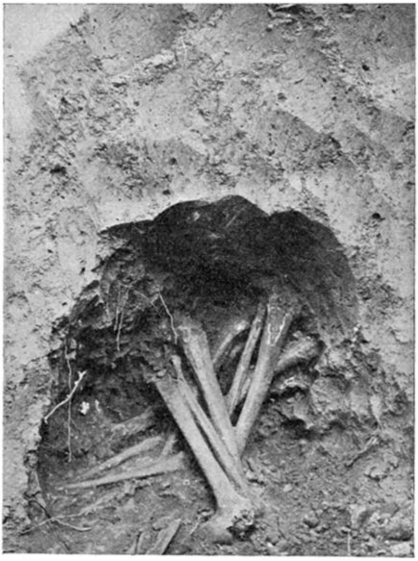


FIG. 91.—An enlarged detail of the excavation shown in figure 90 illustrating one of the bone bundles in position and showing the relation of the burial to the floor level. The earth in which the bones were found is much lighter in color than that filling the house and is unmixed with charcoal.

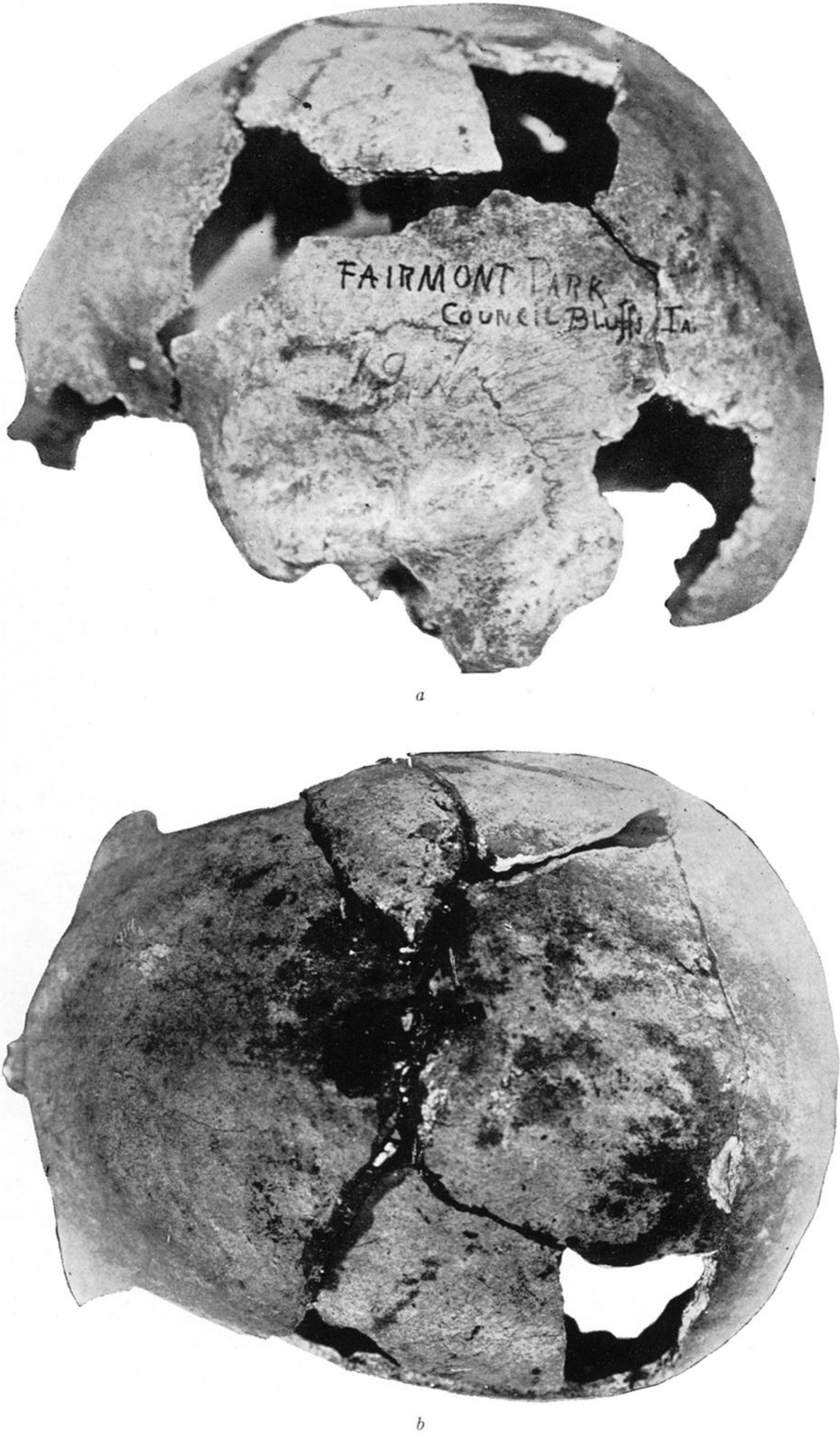
The supraorbital development is pronounced in all of the group but is not comparable with that of Nebraska Loess Man 6 and 8. I know of no other specimen of man discovered in America exhibiting such a heavy ridge; there is, however, in both skulls a clearly distinguishable sulcus supraorbitalis, and their difference from the others of the group being only one of degree inclines one to the view that this feature in these two cases is an individual variation rather than the indication of different racial or tribal origin.

As has been pointed out, the frontal sinuses bear no relation to the supraorbital development; this is well illustrated in comparing this group with the Wallace Mound group. These skulls have very small sinuses that do not extend laterally to any extent and are bounded in front by a very heavy wall. The sutures show a simple pattern of serration but are more complex than the Wallace Mound group. There is no sagittal elevation and the occiput is not prominent as in the Plattsmouth group, none of the skulls show artificial deformation. The temporal ridges are in all cases slight but the nuchal line is heavy and joins a very pronounced external occipital protuberance. The planum nuchale is very rough and irregular. Compared with the nuchal ridge the mastoid processes are underdeveloped. The characteristic parieto-occipital convexity and other features can be best appreciated from an examination of plates XXVIII and XXIX.

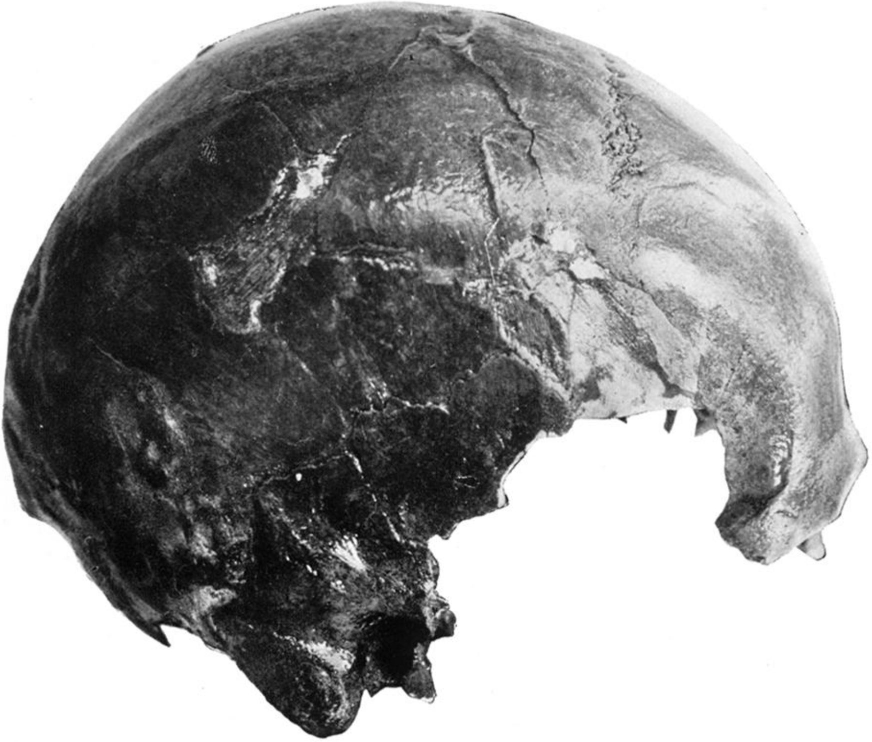
Those specimens having sufficient portions of the face bones uninjured for study indicate no unusual characters; the nose is not flat, there is little prognathism and the lower jaw while well developed is not massive. The teeth present the usual flattened surfaces but are in no way extraordinary.

As a group these crania are characterized by an inferior frontal development and may be considered as belonging to a low order racially. In the case of the Nebraska Loess Man number 6 and 8 this feature, together with the heavy supraorbital ridges, has suggested great antiquity for the specimens. We must, however, depend on the geological evidence in determining the age of these or other crania found in America rather than on the physical characters as uncertain as these are bound to be in the light of our present knowledge of the American Indians.

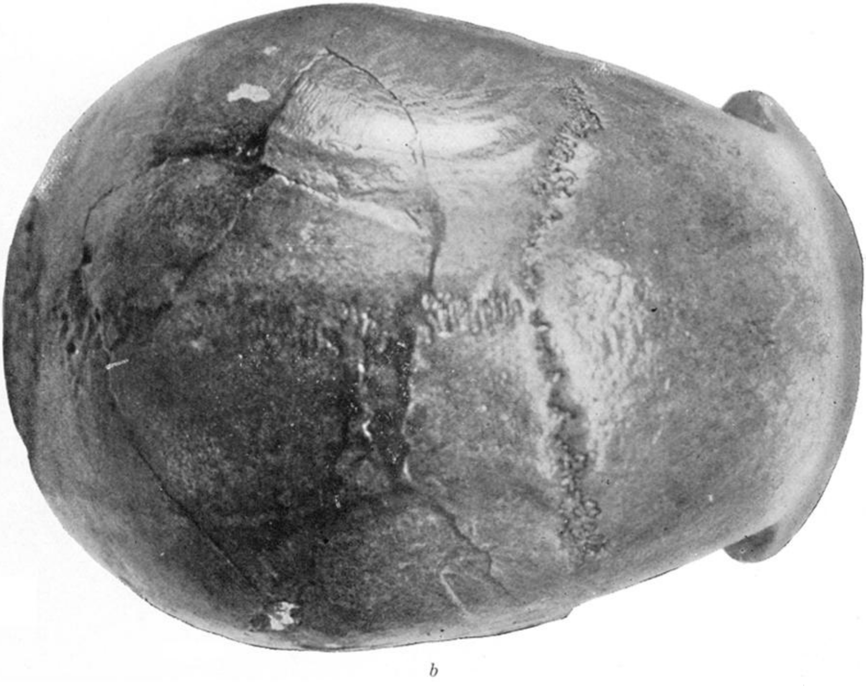
The following figures representing the antero-posterior arcs illustrate better than description certain comparisons which I wish to emphasize. As will be seen I have used Nebraska Loess Man in all of these figures for reasons already pointed out. Figure 92 illustrates the similarity in specimens of the group from the different localities being made up of Loess Man number 6, a Fairmont Park skull and one from the most recent find. In figure



SKULL FROM FAIRMONT PARK, COUNCIL BLUFFS, IOWA. A, SIDE VIEW; B, TOP VIEW



a



b

SKULL FOUND BY MR TONEY, NEAR LONG'S HILL. A, SIDE VIEW; B, TOP VIEW

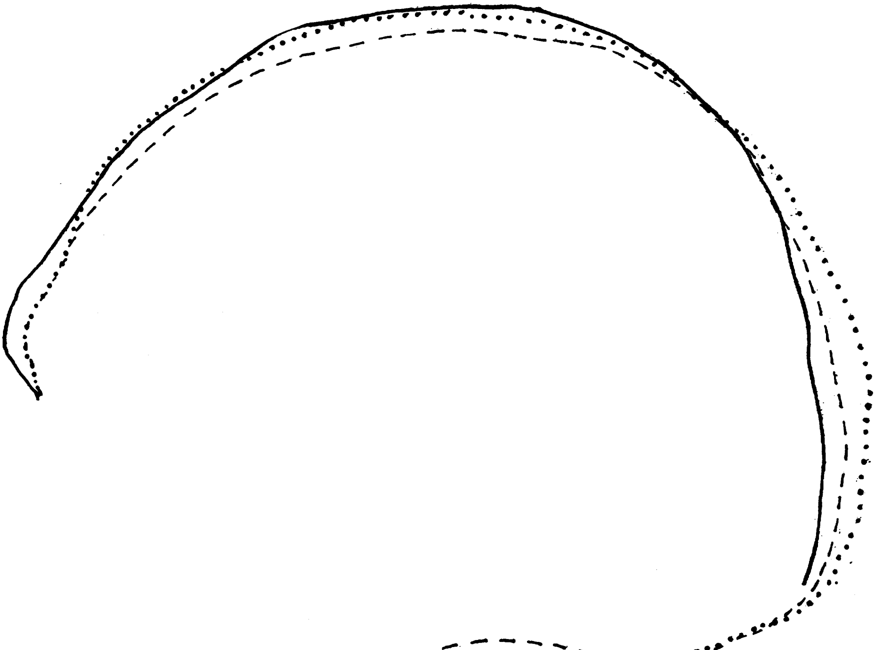
93 a second specimen from Fairmont Park is used with Loess Man number 8 and one of the skulls from the Kentucky burial mounds, number 8087 in the Peabody Museum collection.

In figure 94 Nebraska Loess Man number 6 is compared with a New England Indian number 57383 and a skull from Kentucky number 11342 of the Peabody Museum. Figure 95 is presented to show the difference between the two Nebraska Loess Men number 6 and 8 and a third skull from Fairmont Park.

In the following table, giving the measurements for the group, I have introduced additional data for the purpose of comparison with crania many of which have characters in common with these. The averages for the Dakota Mound Builders was taken from the Check List of the Army Medical Museum by Geo. A. Otis, 1876; the Santa Barbara Islanders and the New England Indians from Carr's report (8–10); the Algonkin from the same source, the Huron from Dr Wilson's (21) study. Montgomery (18) says of the Dakota Mound Builders: "They differ very much from the prehistoric people of Utah and the Southwest. They are akin in culture to the Mound Builders of the Mississippi valley. . . . Measurements of many show the Mississippi index." Hrdlička (15) suggests a relationship between the Long's Hill group, those from Missouri and along the Illinois river.

Table Comparing the Long's Hill Group with the Dakota Mound Builders, Santa Barbara Islanders, New England Indians, Huron, and Algonkin

	Length	Breadth	Height	Cranial Index	Height-Length, Index	Height-Breadth, Index
Long's Hill Group:						
Average	184.4	139	139	75.4	75	100
Maximum	186	147	147	79	77	106
Minimum	171	133	133	73	73	98
Range	15	18	14	6	4	8
Dakota Mound Builders:						
Average	180	138	134	76.2	74	100.7
Santa Barbara Islanders:						
Average	181.1	137	131	76.3	72	95
New England Indians:						
Average	175	132	131	75.2	75.8	100.7
Huron:						
Average	186	139	136	74.3	74.3	100
Algonkin:						
Average	182	140	138	76.9	75.8	98.5



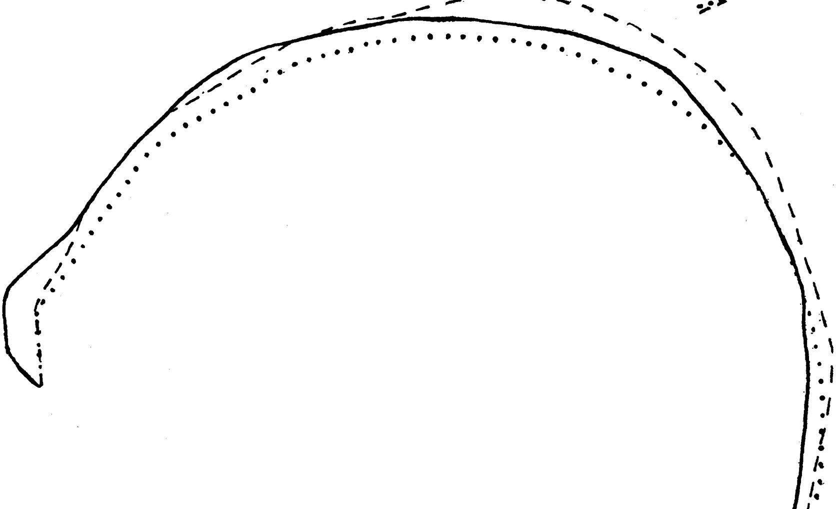
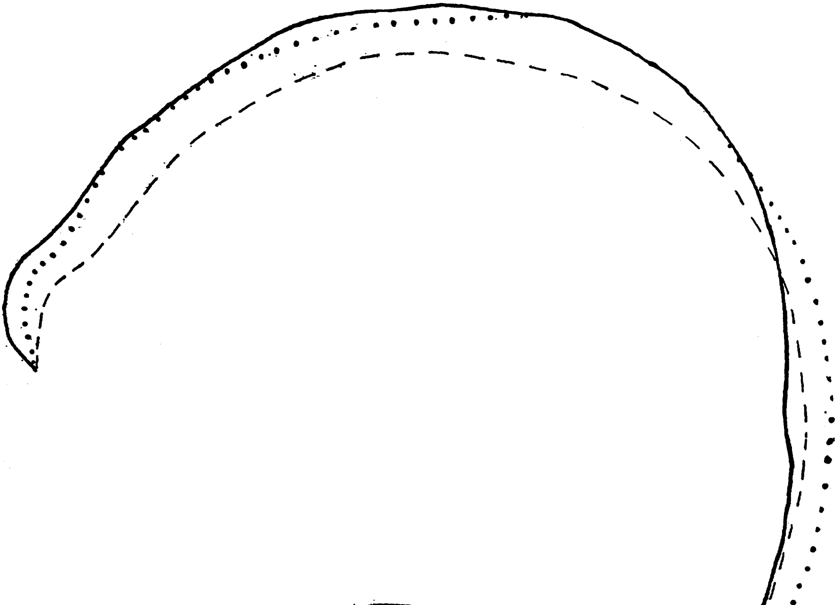


FIG. 92.—Antero-posterior arcs of skulls of the Long's Hill Group. Nebraska Loess Man No. 6; Fairmont Park No. 1; Toney Skull.

FIG. 93.—Antero-posterior arcs of Nebraska Loess Man No. 8; Fairmont Park No. 2; Kentucky Mound No. 8087.



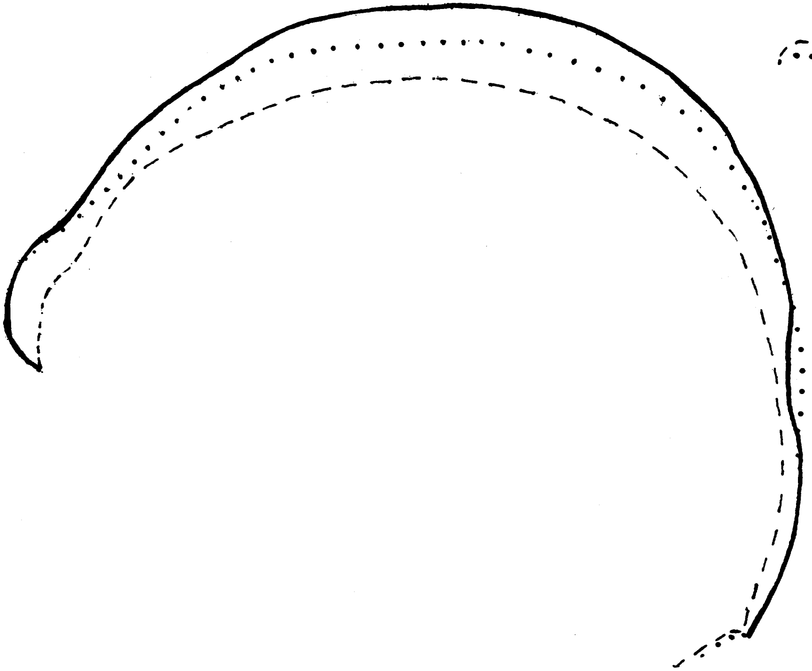


FIG. 94.—Antero-posterior arcs of Nebraska Loess Man No. 6; New England Indian No. 57383; Kentucky Mound No. 11342.

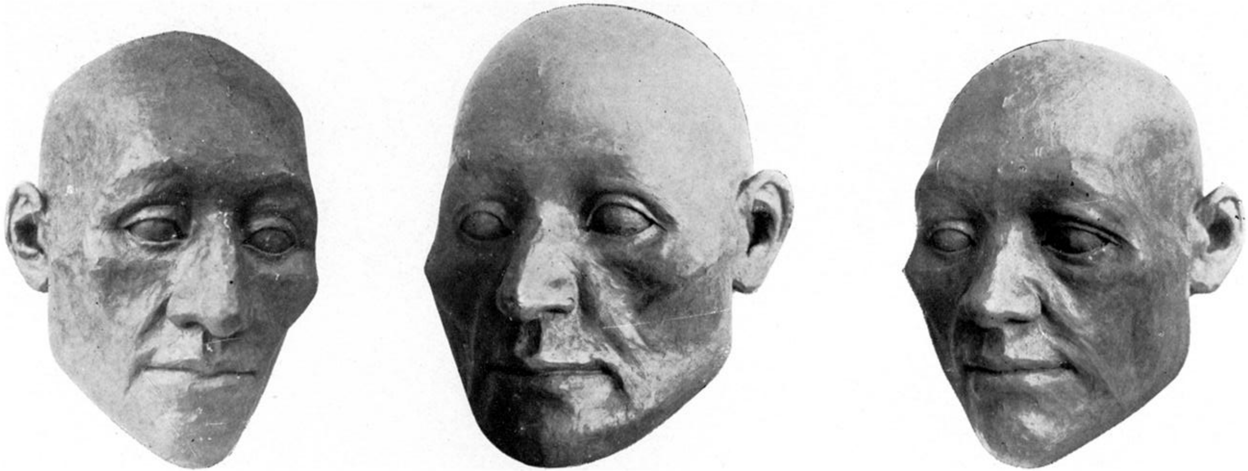
FIG. 95.—Antero-posterior arcs of Nebraska Loess Man No. 6; Loess Man No. 8; Fairmont Park No. 3.

A STUDY OF PHYSIOGNOMY

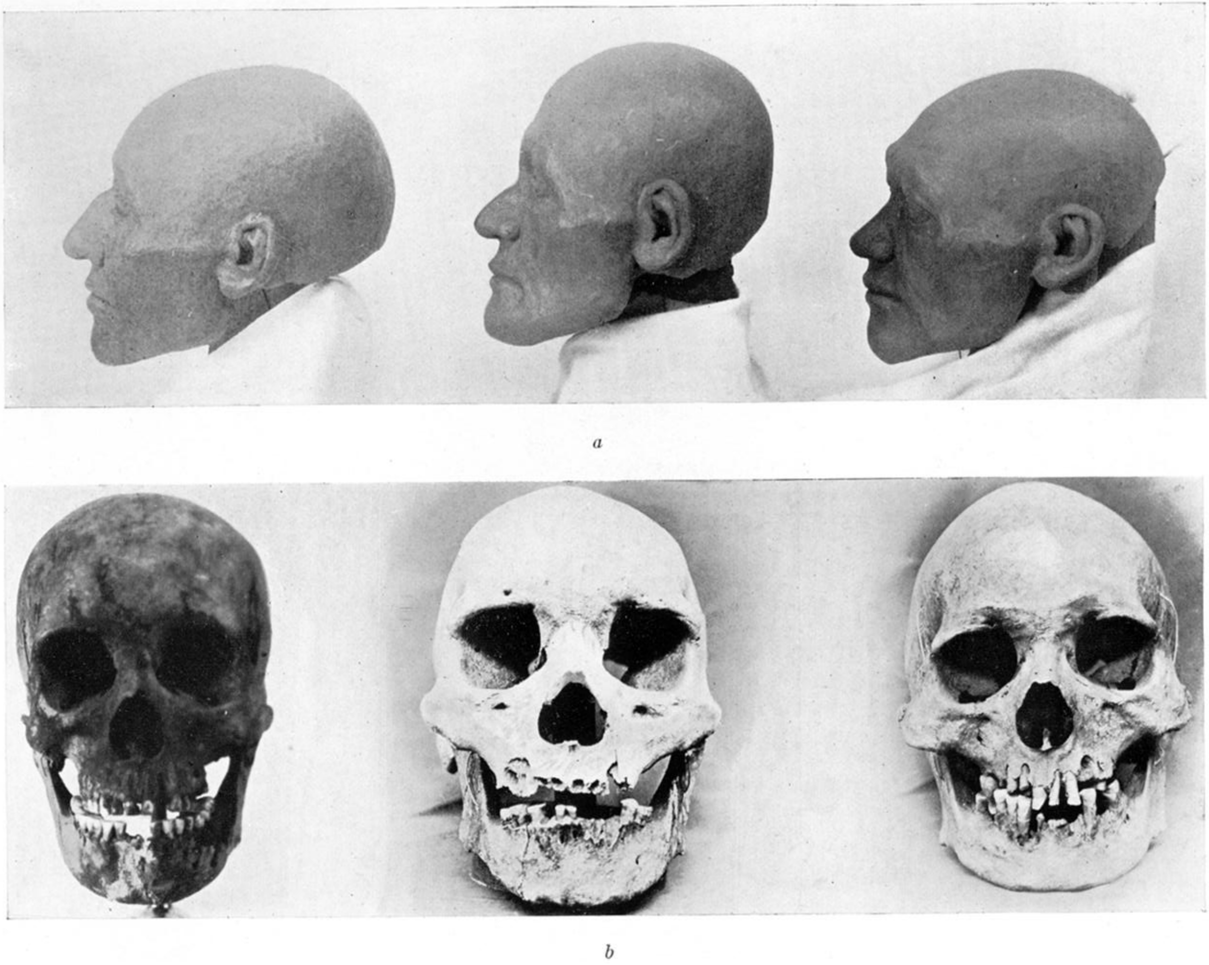
This method of study of physiognomy has been developed by European anatomists who first used it to determine the identity of supposed skulls of illustrious men, notably Kant, Schiller, Bach, and Raphael. The average thickness of the soft parts of the face was obtained by measurements from bodies of persons who had died in sound bodily condition, using a large number of bodies and selecting a sufficient number of points over the bony part of the face to establish the general contour. By markers of some sort, indicating the proper heights, attached to a skull at various fixed points it is possible to fill in over the skull with clay or plastina and so restore the physiognomy. While this method has its limitations, it is of undoubted value in suggesting racial characters for it translates the individuality of the bony face into features with which we are all familiar. It is not necessary to farther review the work or quote the results of the various investigators for Doctor Wilder has very fully covered the subject in his paper on the Indians of southern New England (20).

I employed for this study a skull from the Wallace Mound, one from Long's Mill together with that of an Oto or Pawnee Indian. Miss Warner, the department artist, did the reconstruction and we used the measurements employed by Doctor Wilder but slightly modified his procedure. Thin zinc strips were employed for markers and we found that their greater rigidity made them more satisfactory than paper. The skulls were photographed before beginning the work and points of muscle attachments and other important features were marked on the prints for reference during the reconstruction. The musculature was first built up in the position indicated by the various bony ridges; a dissection from the laboratory was used in this connection as a guide, then the whole was covered to the depth indicated by the markers.

The result of the work can be seen in plates XXX and XXXI. In both the order of arrangement is the same, first on the left the Indian, the Wallace Mound man in the middle and the Long's Hill man on the right. In plate XXXI the side view of the heads is given to bring out certain features not so well illustrated in the



PLASTINA RECONSTRUCTIONS TO COMPARE TWO OF THE GROUPS WITH A MODERN INDIAN. INDIAN ON THE LEFT; WALLACE MOUND HEAD IN THE MIDDLE; HEAD FROM LONG'S HILL ON THE RIGHT



A, SIDE VIEW OF RECONSTRUCTED HEADS ARRANGED IN SAME ORDER AS FIGURE 12. B, SKULLS USED IN THE RECONSTRUCTIONS ARRANGED IN SIMILAR ORDER other plate, and the skulls on which the restorations were made are also given below the several heads. While the features of the Wallace Mound and Long's Hill faces are somewhat more rugged than those of the Indian it seems to me that a racial relationship is very strongly suggested and we have a right to assume that these peoples if not Indians were very closely related to them.

CONCLUSIONS

So far as the evidence of the graves is concerned, with the possible exception of the deeper crania of Long's Hill, there is no reason to consider these as separate races or to assign to them a great antiquity. No one, however, can examine these crania without being convinced that these remains belonged to different tribes. The lines of demarkation are too constant and particular to be explained as individual variation and the characters of each group are quite distinctive of that group.

Judged by craniometric standards these groups have, as I have indicated, a very close relationship to peoples found in other parts of America; considering the fact that this is in the midst of the Plains region with no natural barriers in any direction, this is to be expected and in time such data may aid in the clearer understanding of the earlier movements of man in this country. All of the evidence, as I interpret it, is in favor of considering that these groups belong to the same family from which the Indians sprung if indeed there is not a closer affinity.

It is not necessarily true that geologically ancient man must present a more primitive type of development than that exhibited by the Long's Hill group, but since their somatological characters do not satisfy our ideal of primitive man we must await undisputed geological evidence to establish the type.

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